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WHAT IS CLAIMED IS:

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- (1. (Amended) A magnetic storage medium, comprising:
- a magnetic recording layer;
 - a superconducting layer; and
 - a thermal insulation layer, provided between the superconducting layer and the magnetic recording layer, for reducing heat transmitted from the superconducting layer to the magnetic recording layer,
- wherein
- a Curie temperature of the magnetic recording layer is equal to, or higher than, a critical temperature of the superconducting layer.
2. The magnetic storage medium as set forth in claim 1, wherein
- the thermal insulation layer is a non-magnetic insulation layer.
3. The magnetic storage medium as set forth in claim 1, wherein
- the magnetic recording layer is composed of a Co alloy.
4. The magnetic storage medium as set forth in claim 1,

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wherein

the magnetic recording layer is composed of a perpendicularly magnetized artificial lattice.

5. The magnetic storage medium as set forth in claim 1, wherein

the magnetic recording layer is composed of a perpendicularly magnetized amorphous alloy of rare earth and transition metals.

6. The magnetic storage medium as set forth in claim 1, wherein

the superconducting layer is composed of a high temperature superconductor oxide.

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10. (Amended) A method of recording and reproducing using a magnetic storage medium in which at least a magnetic recording layer and a superconducting layer are deposited, a critical temperature of the superconducting

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layer being equal to, or higher than, a Curie temperature of the magnetic recording layer,

wherein:

data is recorded in the magnetic recording layer by passing a signal magnetic field produced by a recording-use magnetic head through a part of the superconducting layer where the data is to be recorded and diamagnetism disappears; and

data is reproduced from the magnetic recording layer by detecting, using a reproduction-use magnetic head, a magnetic flux leaking from the magnetic recording layer through a part of the superconducting layer where the data is to be reproduced and diamagnetism disappears.

11. The method of recording and reproducing using a magnetic storage medium as set forth in claim 10, wherein:

diamagnetism in the superconducting layer disappears through heating by the heating means; and

the heating means is semiconductor laser beam projection means.

12. The method of recording and reproducing using a magnetic storage medium as set forth in claim 10, wherein

either one of the recording-use magnetic head and

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the reproduction-use magnetic head is a thin film
magnetic head.

13. The method of recording and reproducing using a magnetic storage medium as set forth in claim 10, wherein

the reproduction-use magnetic head is a magnetic resistance element.